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THE LIMITATIONS OF BRIEF INTELLIGENCE TESTING WITH YOUNG CHILDREN.

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A STUDY EXAMINED THE VALIDITY OF TWO BRIEF INTELLIGENCE SCALES, THE PEABODY PICTURE VOCABULARY TEST (PPVT) AND THE COLUMBIA MENTAL MATURITY SCALE (CMMS), TO SEE IF THESE TESTS OVERESTIMATED THE INCIDENCE OF INTELLECTUAL RETARDATION AMONG POVERTY AREA CHILDREN. THESE TWO TESTS AND AN EXPERIMENTAL MEASURE OF INTELLIGENCE, THE JOHNS HOPKINS PERCEPTUAL TEST (JHPT), HAD BEEN GIVEN TO 28 KINDERGARTEN CHILDREN. A SIGNIFICANTLY LESS RETARDATION INCIDENCE WAS FOUND WITH THE JHPT. ACTUAL PERCENTAGES WERE 69.56 ON THE PPVT, 17.86 ON THE CMMS, AND 3.57 ON THE JHPT. THEREFORE, AS A CRITERION MEASURE, THE STANFORD-BINET WAS ADMINISTERED TO EACH CHILD. IT WAS FOUND THAT THE CHILDREN TESTED ON A MUCH HIGHER LEVEL OF INTELLIGENCE THAN REPORTED ON THE PPVT AND CMMS, ALTHOUGH THE CMMS EXAGGERATED LESS THE DEGREE OF RETARDATION. IN THE SAME SCHOOL, A SAMPLE OF FIRST GRADE CHILDREN REPRESENTING AN ENTIRE KINDERGARTEN CLASS OF THE PREVIOUS YEAR WAS GIVEN THE PPVT, CCMS, AND THE STANDFORD-BINET. TWENTY-NINE CHILDREN PARTICIPATED. IT WAS FOUND THAT THE PPVT STILL UNDERESTIMATED INTELLIGENCE TO A STATISTICALLY SIGNIFICANT DEGREE. THE MEAN IQ SCORE INCREASED 18.86 POINTS ON PPVT PERFORMANCE, INDICATING THE INFLUENCE OF EDUCATIONAL EXPERIENCE. ALTHOUGH THE STANFORD-BINET STILL PLACED ALL CHILDREN IN THE NONRETARDED CATEGORY, THE PPVT RATED 24.14 PER CENT AND THE CMMS SCALE, 10.34 PER CENT AS RETARDED. A BRIEF CULTURE-FAIR SCREENING MEASURE IS NEEDED. (MS)

THE ~~VALIDITY~~ LIMITATIONS OF BRIEF INTELLIGENCE TESTING WITH YOUNG CHILDREN [1]

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This study examined the validity of two well-known brief intelligence scales; The Peabody Picture Vocabulary Test (PPVT) and The Columbia Mental Maturity Scale (CMMS). Data obtained with these two tests during the summer of 1965 "Headstart" program of the Baltimore City Board of Education, suggested that both tests may be seriously overestimating the incidence of intellectual retardation among poverty-area children.

Specifically, the study was initiated as the result of our finding a significant difference in the incidence of retardation when one compared the PPVT and CMMS to results obtained with an experimental measure of intelligence, the Johns Hopkins Perceptual Test (JHPT). All three tests had been administered to a group of kindergarten-age children. The PPVT estimated the incidence of retardation (I.Q. equal to or below 69) to be 69.56%; the CMMS, 17.86%; the JHPT, 3.57%.

Since the JHPT is still in an experimental stage (Rosenberg, Rosenberg, and Stroud, 1966), it obviously cannot be used as a criterion measure. Hence, the Stanford-Binet Intelligence Scale (S-B) was administered to each child.

A description of the subject sample is presented in Table 1. The results are summarized in Table 2. It is readily apparent that the PPVT and CMMS underestimated the intelligence of these children to a statistically significant degree. Table 3 gives one an idea of the "clinical description" of the group that an examiner might make with data based on the three tests. The CMMS exaggerates the number of children in the "Borderline" and "Mental Defective" catagories while the PPVT places over two-thirds in the "Mental Defective" category.

As the data in Table 4 demonstrates, those youngsters labeled "Mental Defective" by the PPVT and CMMS were not simply children of Borderline I.Q. who moved a bit lower on these two tests. They also included children whose intelligence, according to the S-B, fell in the 90 to 109 range.

It was felt that with increased school experience, children might be better able to perform on the PPVT. This might result in their PPVT scores being in better accord with S-B findings. Hence, a sample of first-grade children was administered the same three tests. These subjects were all enrolled in the same school and came from the same socio-economic strata as did the first sample of kindergarten children. It was important, of course, to control for various selective factors which could have operated between kindergarten and first-grade. For example, retarded youngsters might well not move on into first-grade due to their being required to repeat kindergarten or being withdrawn from school. Our procedure was to obtain the entire roll of one of the previous year's kindergarten classes and to test each of these children.

The class roll totalled 34 children. All had been promoted to the first grade and 29 were still in the same school. Of the 29, four were actually still performing at a kindergarten level. Five children had transfered to five different schools. One of these five could not be traced as the family had apparently moved out of the city. Two of the five were reported to be doing very well in the first grade, and two were described as being poor students. Due to various administrative problems, testing of these four subjects was not attempted. The sample then consisted of the 29 children enrolled in the same school as the kindergarten sample.

The kindergarten group had been tested during the first and second month of the kindergarten year. This new sample was examined during the fifth and sixth month of the first grade. The difference between the two groups in terms of "educational time" was, therefore, approximately 14 months.

Table 5 describes the subject sample. The results are presented in Table 6. The findings indicate that the PPVT still underestimates intelligence to a statistically significant degree. Comparing the PPVT scores obtained with the kindergarten sample with that of the first-grade group, demonstrates the degree to which the PPVT is influenced by educational experience. The PPVT mean I.Q. score increased 18.86 points; a difference that was statistically significant ($t=3.96$, $p<.01$).

Although the mean CMMS score was found to be not significantly different from the mean S-B score, the data presented in Table 7 demonstrates that this test still seriously overestimates the incidence of retardation. The PPVT reported 24.14 % below an I.Q. of 70; the CMMS, 10.34 %; and the S-B, zero %.

The results of this study indicate that the Peabody Picture Vocabulary Test and the Columbia Mental Maturity Scale grossly underestimate the intelligence of poverty-area children. The degree of error is reduced somewhat when the children have undergone some schooling. These findings support an impression held by many clinicians that many of our standard measures of intelligence cannot be used with deprived children. These findings emphasize that "brief" tests of intelligence are especially inaccurate in this regard. Although not used in the present study, we also have data indicating that the "Draw-A-Man", a popular non-verbal measure, is also extremely inaccurate with these children. Our conclusion is obvious: there is a primary need for a brief screening measure that can be demonstrated to be culture-fair.

Footnote

1. This study was supported in part by the Office of Economic Opportunity (Contract 510; Principal Investigator: Leon Eisenberg, M.D.).

References

Rosenberg, L.A., Rosenberg, Anna M., and Stroud, Michael (1966). The Johns Hopkins Perceptual Test: the development of a rapid intelligence test for the pre-school child. Paper presented at annual meetings of the Eastern Psychological Association, New York, N.Y.

TABLE 1

The Kindergarten Sample

	N*	Sex	Race	Age in Months Mean	S.D.	Range
PPVT	23	13 M, 10 F	Negro	62.04	3.95	58-70
CMMS	28	16 M, 12 F	Negro	62.04	3.95	58-70
S-B	28	16 M, 12 F	Negro	63.61	3.94	58-70

*23 children were administered all three tests; 5 received only the CMMS and S-B.

TABLE 2

The Kindergarten Sample Results;

Mean I.Q. Scores And Relevant "t" Tests

	Mean I.Q. Score	S.D.
PPVT	66.52	15.15
CMMS	83.96	15.29
S-B	91.32	15.83

"t" Tests

PPVT vs S.B. t = 9.98 p < .01

CMMS vs S.B. t = 4.58 p < .01

TABLE 3

Percentage of Kindergarten Sample Placed in Each of Four Intelligence Classifications By The Three Tests Used

Intelligence Classification	I.Q.	PPVT	CMMS	S-B
Average and up	90-	17.39	39.29	50.00
Dull Normal	80 89	4.34	17.86	28.57
Borderline	70-79	8.69	25.00	17.86
Mental Defective	69 & below	69.56	17.86	3.57

TABLE 4

The "True" Intelligence Classification (using S-B) Of Those Subjects Labeled Defective by the PPVT (N=16) and the CMMS (N=5)

Intelligence Classification by S-B	Mental Defective by PPVT	Mental Defective by CMMS
Average	6	1
Dull Normal	6	1
Borderline	3	3
Mental Defective	1	0
	16	5

TABLE 5

The First-Grade Sample

N	29
Sex	15 M, 14 F
Race	Negro
Mean Age (in months)	77.28
S.D.	3.04
Range	73 to 84

TABLE 6

The First-Grade Sample Results;

Mean I.Q. Scores And Relevant "t" Tests

	Mean I.Q. Score	S.D.
PPVT	85.38	17.68
CMMS	89.28	14.94
S-B	92.10	12.29

	"t" Tests	
PPVT vs S.B.	t = 4.40	p. < .01
CMMS vs S.B.	t = 1.67	p. > .05

TABLE 7

Percentage of First Grade Sample

Placed In Each of Four Intelligence

Classifications By The Three Tests Used

Intelligence Classification	I.Q.	PPVT	CMMS	S-B
Average and up	90-	41.38	48.28	51.72
Dull Normal	80-89	24.14	34.48	31.03
Borderline	70-79	10.34	6.90	17.24
Mental Defective	69 & below	24.14	10.34	00.00